OnLine Journal of Earth Sciences 8 (1): 13-18, 2014
ISSN: 1991-7708

The Grand Planetary Oxygen Cycle? A Whole Earth Perspective

Mario Gosalvez
Former Head of Experimental Biochemistry (1970-1992), Clinica Puerta de Hierro,
National Centre of Medical and Surgical Research, INSALUD and School of Medicine,
Universidad Autonoma de Madrid, Madrid, Spain

Abstract: The hypothesis that a non-photosynthetic oxygen production by the cell filamented and conified membranes of living organisms, may add to the net balance of gases of the planet Earth is put forward. I am referring earliar to all those cellular species, mostly without nucleus called unicellular facultative aerobes. These cells could represent the higher fraction of the biomass, in most places and at most times when living organisms expand during the interglacial periods. This proposal is based on the earliar findings on mitochondrial filamentation. This emerging field has shown the recurrent union of short filaments of the cytoskeleton on the external membrane of the mitochondria of several cellular species. That gives these organelles in hypoxia and with a high carbonic anhydride present, a capacity for oxygen production higher than its oxygen consumption, especially during the organisms' periods of rest and obscurity. Our precise area of expertise is the energy metabolism of cancer. Cancer metabolic characteristics, low mitochondrial respiration and high aerobic glycolysis are also present in many primitive single cell cellular species without or less frequently with nucleus and its cellular associations of different types, such as phytoplankton or zooplankton, cell collections considered together a major fraction of Earth total biomass. Additionally, I include some feasible scientific proposals for the unifying theory of biological structure and organization and the theory of evolution of life, according to the intelligent universe hypothesis and the theory of design and purpose in evolution.

Key words: Organism, mitochondria respiration, nucleus, biomass, oxygen production

INTRODUCTION

The initial discovery of oxygen production by anoxic filamented mitochondria in the presence of carbon dioxide, Gosalvez (2012, 2013a-f) could be soon corroborated by studies of physiological oxygen free radicals and other studies. In essence, the existence of recurrent cycles of mitochondrial filamentation and defilamentation is proposed which could significantly vary the net oxygen stationary concentration by varying the ratio between oxygen production and consumption by cellular membranes.

In the future, some of the findings will possibly be more specifically extensible to different filamented or conified membranes of diverse isolated or more or less coupled, living cells in the animal, vegetable and other phylum. As well as earliar all in the most abundant life component, the prokaryotes cells of the water, soil and air biomass of the planet (Tudge, 2000). Perhaps, it will also be found in many more living unicellular beings included in the difficult to classify intermediary or mixed systems (May, 1988). It would, thus be a general phenomenon of the living cell to be proven in some years. Special attention to the living internal heat production must be taken into account at the phases of the filamentation-defilamentation cycles, showing well-dressed membranes with filaments, cones and veils.

Naturally, *in vivo* with temperature ranges that are usual in the periods between glaciations, this non-photosynthetic cellular production of oxygen whether it is during the day or at night time, leads at different times to a different endogenous cellular concentration of oxygen according to the respiratory rest parameters of the cell type in question. This recurrent oscillation would represent a stationary state capable of influencing he transport of oxygen to the tissue or to the cellular complex. Or and as well from the tissue or cellular association to the rest of the system or organism. When the Earth is thought of as an organism, the atmosphere represents the outer membranes (Sugimoto, 2002).

This new beginning, a step forward in bioenergetics, adds a series of possible suggestions to the Unifying

Corresponding Author: Mario Gosalvez, Hospital Universitario Puerta de Hierro (1992-2010),
IMSALUD and School of Medicine, Universsidad Autonoma de Madrid, Madrid and Majadahonda,
Comunidad de Madrid, Spain

Theory of Biological Structure and Organization (West and Brown, 2005) and a new possibility of contemplating life's evolutions in Earth and the universe from the point of view of the Intelligent Universe Hypothesis (Crick, 1981; Hoyle, 1983). All of that in a mixed approach under the prism of intelligent design and purpose of evolution (Ruse, 2003) which I propose should be scientifically deeply considered.

A new explanation of glaciations is first speculated along these lines of thinking with one proposal of future developments in the long run from molecular physiology. Future possible applications for the study of mitochondrial filamentation have been concisely indicated (Gosalvez, 2012, 2013a-f). This study could open a possible role for this field in some future studies on Earth Sciences.

The grand planetary oxygen cycle? I should like to draw your reader's attention to the possible role of a new possible oxygen production in other words the non-photosynthetic cellular membrane oxygen production from all the living kingdoms in the evolution of most species on aqueous oxygenated living planets, such as the Earth; the blue planets with mankind.

I firmly believe, as many others do (Crick, 1981; Hoyle, 1983) that we are not alone in the universe and that the universe is an intelligent one that the planet is just one more among the thousands of living planets in the habitable zone (Lineweaver *et al*., 2004) of the galaxy and that the existing flora and fauna have led to the appearance of mammals and thus clearly represent the capacity to shelter evolution from primates to hominoids and from these to man (Carbonell *et al*., 2008).

I also firmly adhere to the hypothesis of intelligent design and purpose in the universe's and Earth's life (Ruse, 2003). Although, I do mainly so from the strictest lines of thought which is the proposal of true scientific and feasible experiments which could be corroborated or not sooner or later by experts.

Thus, I will try to put the following hypothesis forward: Should our atmosphere change to a greater concentration of carbon dioxide with lower oxygen content, perhaps we would evolve over millions of years to bigger sized fauna and flora, based on animal species with the preponderance of reptile epigenetics.

Perhaps, fauna and flora of that type disappeared from the Earth at the end of the quaternary period when oxygen levels rose and carbon dioxide ones fell. In any case, it could be argued that we could return to hypoxic atmospheric conditions with high carbon dioxide levels either sharply or more or less gradually, if we managed to vary more or less quickly, the stationary state of the atmospheric gases.

On the planet's net oxygen supply balance sheet researchers have mainly only taken into account up until now to the debit of life forms, the consumption of oxygen through respiration and the increase of oxygen from photosynthesis. Things may now vary substantially with the introduction of oxygen production by filamented and conified membranes. If this global oxygen production did not exist, linked to the evolution of oxygen by photosynthesis, perhaps the calculations after subtracting respiration would show that we could have reached the start of global hypoxia. The changes suffered by civilization over the most recent thousands of years have been very rapid (Kintisch, 2009) with known consequences in deforestation, depletion of marine fishing banks, effects that influence climate and other matters already known by all of us through the media.

Taking stock nevertheless of the net planetary oxygen balance, relying on new global oxygen production that we have put forward, we could find in the mid range of estimations that the decrease of photosynthetic oxygen development increases oxygen production by membranes and consumption by respiration decreases. Of course, this assertion has to be corroborated, perhaps through adequate experimental planetary simulation means using small laboratory systems. Our civilization, especially if we upset the plankton cycles (Margalef, 1996), could sharply alter the net balance of planetary oxygen and carbon dioxide in thousands of years. This would certainly be the case if the counterbalance, we are proposing if we could not rely on the non-photosynthetic membrane oxygen production.

Another way of varying the net balance of planetary oxygen would be the hyperoxic one. Diminishing respiration, increasing the development of photosynthetic oxygen and adding favorable changes to non photosynthetic production of oxygen by cellular membranes would take us to a hyperoxic Earth. In that scenario, we would reach a world where low level winged forms predominated both in the air as well as the sea in some millions of years.

The existence of a Grand Planetary Oxygen Cycle is therefore proposed on the aqueous planets with an oxygen atmosphere, life and human beings able to evolve between hypoxia, normoxia and hyperoxia for our kind of humanity, in any direction, over the eons with the consequent changes in the evolution of species and annexed mankind. On the planets with a level of human civilization most destructive to the atmosphere, these changes in the oxygen level could occur sharply within thousands of years. It is logical to reason that those planets would have evolved rapidly and that its secondary civilization would have a greater destructive force than constructive capacity.

Assuming that the hypotheses of the expansion of life throughout the universe (Crick, 1981; Hoyle, 1983) are true, those planetary types would be helped from the onset of those changes by the more advanced human planets in their galaxy. These would be the initiators of their first civilization in a process of various stages to expand life throughout the habitable galaxies of the universe (Hoyle, 1983; Crick, 1981).

It is not illogical to think that in the last 10 or 15 centuries the beginnings of the compensation phenomena for the aforesaid counterbalances, earliar all the non photosynthetic oxygen production by cellular membranes are ready to be activated. Therefore and as quickly as possible, we need to obtain from cellular and physiological bioenergetics the understanding for non-photosynthetic cellular oxygen production in as many cellular species of life as possible. At least at the level with which the evolution of photosynthetic oxygen is known or we understand the cellular and physiological respiration in superior mammals.

Proposals for the unifying theory of biological structure and organization: I think that this theory (West and Brown, 2005), considered from the point of view of the experience in several aspects of energy metabolism of isolated cellular life would need at least to be supplemented in some respects in the coming decades.

To define approximately the cellular species with the highest proportion of biomass that could be known at present as having either one, two or three metabolic characteristics, respiration, glycolysis and photosynthesis. I suspect that cells with respiration and aerobic glycolysis, facultative aerobes prokaryotic cells like the unicellular fungi yeast will be a major component now-a-days. But, the diversity of cellular adaptation in this aspect could vary very much with variation of solar irradiation cycles, nutritional aspects and other matters, altering the metabolism, size and growth rate of cellular aggregates.

To define in a significant number of cellular species which are most prevalent in the biomass composition, the biochemical methods necessary to install changes in the intensity of respiration glycolysis and photosynthesis. Based on unpublished experiments, I believe that using different starvation procedures, temperature manipulations, changes of nutrients and earliar all environmental gases, it could be found that a much higher proportion of cellular species could acquire levels of respiration, aerobic glycolysis and photosynthesis in the due proportions necessary to buffer the Earth's main ambient gases to the benefit of continuation of life at large.

To define in a large number of cellular species showing different proportions of respiration, aerobic glycolysis and photosynthesis the existing relationships with its body size, growth rate and the presence of a more or less organized cytoskeleton, the early aspects in each case of this. As is occurring with mammalian cancer cells, those cellular species with lower respiration and higher aerobic glycolysis will show the faster growth rate and smaller size because their specific pre-cytoskeleton proteins are much less organized. The contrary will be shown with cellular species with high respiration and low aerobic glycolysis. An intermediate situation will be found in cells that also have photosynthesis or other metabolic characteristics.

EXPERIMENTAL PROPOSALS FOR THE THEORY OF EVOLUTION

This theory without doubt in my humble opinion must now be complemented along the lines of the evolution of living beings and humanities all across the many millions of galaxies with habitable zones (Darwin, 1859; Williams, 1966; Dawkins, 1983; Ruse, 2003; Lineweaver *et al*., 2004). Considering that there is evolution of life from the universe's first living cell until the ultimate cellular ending.

I will also venture to present some points that take into account the more than probable intelligent lines of design and purposes in a possible Universal Plan. I put forward some ideas on this hypothesis >30 years ago to propose some ways of entering into a cosmological concept of life. I then felt it to be probable, considering things in the widest conceptual contexts as possible (Gosalvez, 1981, 1982). I am proposing now specific, inexpensive feasible studies.

To define anomalies and disparities of the sequence of apparition on Earth of different achievements in life evolution complexity. I certainly suspect that some life traits appeared at different times than should be expected in a logical life evolution sequence. If we do not accept (this should be studied as deeply as possible) distinct influences of exterior Godfather planets of the Earth of the galaxy or more or less distant galaxies. To cite one example of the many available, it seems to me very strange that nucleated cells with mitochondria appeared established so rapidly in the absence of many of the necessary intermediate cellular forms so far encountered.

To define as best as possible what different changes took place in Earth's development for the present type of life, during each 25 million year period occurring every 500 million years or so. From the first origin of the

planet, perhaps 4,500 years ago and especially by considering not only its chemistry and physics but also its biological aspects.

To define-anomalies and disparities in the development of humanity over the last 1.5 million years ago, searching adequately for hidden deposits made in the last 150,000 years earliar all. Guarded from eventual destruction with due and logical care so as to be discovered, only when the Earth's civilization reaches the scientific level capable to suspect extra-planetary influences and impetus necessary for the development of the human race. I certainly think that this moment will arrive in this century and I will be ready to convey my thoughts if requested by interested scientists in this matter.

Earth observatory studies and global cooling and warming: The very last accumulated data on world average surface temperatures and ice coverings, only to put an example together with recent data on oceanic currents, confirms now perhaps a global cooling (Earth NASA Observatory Global Cooling, Latest Reports 2013). The very important warnings received through the media on global warming which perhaps could end now abruptly given way to very severe successive winters suggest me a concise overview on the essences and influences the Earth's climate.

Just from the point of view of an interested scientific spectator without any real expertise in these fields, if you permit me, I would add a few feelings:

- Climate is a multi factor varying condition really now still out of complete comprehension
- Solar irradiation cycles, humidity, oceanic currents and Earth and sea quakes are among the important factors
- The atmospheric gases, together for example with humidity conditions in the long range are essential for life sustainability earliar all for the type of humanity
- Internal heat, derived from metabolism, of single living cells could represent a buffering capacity of temperature sudden variations if encompassing enough billions of billions of billions of cells
- The net balance of gases, emitted from civilization excesses may alter, sufficient time being given, the physiology of all type of living organisms. This is a warning that must remain always within us
- In global warnings periods, non civilization or civilization caused, emissions of carbonic anhydride could have some weight

Intelligent design and purpose in evolution? Resorting only to scientific arguments, leaving aside the theological and religious knowledge with due social respect, I think that could be exaggerated in today's science pulpits to leave the evolution of energy, matter, life and death in the universe and the planet, only to an incredible series of lucky events of chance and necessity.

In the last decades, our knowledge has grown just enough, I believe to construct an alternative and different vision. For the many, as I am sufficiently familiarized with the essentials of the main areas of knowledge: Philosophy, Mathematics, Physics and Biology, this incredible, enormous luck of visualizing things might only be perhaps, a very necessary lever for rational dialectics. A character deeply rooted in the constitution of the human mind of most people.

That is to say that the tenet that we are all alone (which arose perhaps to provide the thesis of departure), it now could search for the antithesis to surge, most possibly we are completely accompanied. From the studies of the contrasts of this apparent dissension we could then slowly approach the truth in the following centuries.

I humbly request such a big effort be made. Please, I dare also to beg to leave the more unequivocal esoteric data to play its role with due careful scrutiny. Electrophysiology, Chemistry and so many serious and the more useful sciences for humanity now were born surrounded by hilarity and lack of respect by the erudite of the past. Let us now in this issue, as in many other matters look for records that could be blessed by the future.

FIRST SEED CONCEPTS FOR A NEW THEORY OF GLACIATIONS?

In my humble opinion, many details of the Earth's orbit around the Sun, together with the planetary composition of Earth and other planets of the solar system from a deep scrutiny, portrait possibly a final state of preparation of suitable planets like ours for life and humanity (Hoyle, 1983). On the part of our Godfather's very advanced older planets of the habitable zones not only of our galaxy (Linweaver *el al*., 2004) but of other adequate galaxies as well. These last planets would be situated deeply in the firmament towards our universe's periphery.

With such a young star as the Sun, there would not be as yet an easy way to prepare such marvelous blue planets like ours, avoiding the important lasting changes in temperature called glaciations. But it would be enough, as the humanity has just begun many superior sciences in

the last 600 years of this interglacial period to perhaps be able to reach in the next several hundreds of years different ways of manipulating the major cellular fractions of the biomass as one of the main factors to avoid the next long glacial period.

I think that it would begin in about 14,000 years and it could produce a very deep global freezing of the Earth with a possible duration of >40,000 years. The global warnings and global freezings of short lasting duration that we have experienced and will again from 300 years ago to 300 years, hence perhaps will announce that we are just in the middle of the interglacial period.

Let me venture once again to suggest that perhaps, this century would signal a perfect time to start to think on our own solution to avoid this disaster for our mankind and animal and vegetal kingdoms, unless before next glaciations, humanity had develop good hibernating capacities. This perhaps, at a very incipient level might be already signaled in the longer rests of some chronic human inhabitants of the North and South poles.

Any how, I feel that the due succession over the few next 1000 years with the best possible progress in physiological cellular energy metabolism control and manipulation in any kind of living organism would be required, I think for this unavoidable endeavor in the very long run.

As it would occur, perhaps with the presence of bacteria in collaboration with life in many organisms or the infections of pathogen microorganisms in many others, the diversity and adaptability of each ecosystem and the state of diversification and adaptation of the global ecology of the planet could be changed for its different main cellular components in respect of dependency and emission of different gases and to the internal heat production at different ambient temperatures. In my opinion, these procedures would be the main ones out of the dozens of measures that probably need to be taken in order to obtain in not too many centuries, a stable atmosphere capable of slowly and recurrently cushioning the great solar instabilities of solar energy emissions of all types.

CONCLUSION

A new speculative explanation of glaciations is also mentioned. It is also provided a concise discussion of climate changes studies that show my gratefulness to these necessary social warnings on global warming and cooling. I feel that to advance as much as possible in the care of theairs, waters and lands is of paramount importance in the long range.

ACKNOWLEDGEMENT

The researcher is very grateful for the numerous linguistic English corrections of this study to his friend Mr. Andrew Guy.

REFERENCES

Carbonell, E., J.M.B. de Castro, J.M. Pares, A. Perez-Gonzalez and G. Cuenca-Bescos *et al*., 2008. The first hominin of Europe. Nature, 452: 465-469.

Crick, F., 1981. Life Itself: Its Origin and Nature. Simon and Schuster, New York, ISBN: 9780671255633, Pages: 192.

Darwin, C., 1859. On the Origin of Species. Broadview Press, London, ISBN: 9781770480087, Pages: 672.

Dawkins, R., 1983. The Blind Watchmaker. W.W. Norton, New York.

Gosalvez, M., 1981. Towards a Cosmological Concept of Life. Imprenta Ideal, USA., ISBN: 9788430046096, Pages: 46.

Gosalvez, M., 1982. The Zipper Mechanism. El autor, USA., ISBN: 9788430083220, Pages: 113.

Gosalvez, M., 2012. Mitochondrial filamentation: Some methods of isolation and assay. IOSR J. Pharm. Biol. Sci., 4: 37-39.

Gosalvez, M., 2013a. Metabolic control of respiration and glycolysis of tumoral cells. Adv. Biol. Chem., 3: 86-89.

Gosalvez, M., 2013b. Methods to be developed for some first applications of mitochondrial filamentation. Open J. Biophysics, 3: 51-53.

Gosalvez, M., 2013c. Reversal of cancer by dual strategy? J. Cancer Therapy, 4: 518-520.

Gosalvez, M., 2013d. Mitochondrial filamentation: A therapeutic target for neurodegeneration and aging. Am. J. Alzheimer Dementias, 28: 423-426.

Gosalvez, M., 2013e. Cancer as a therapeutic agent? J. Cancer Therapy, 4: 1362-1365.

Gosalvez, M., 2013f. An experimental proposal for low order laboratory animals. Extension of Metabolic Life? Advances in Biological Chemistry, September 6.

Hoyle, F., 1983. The Intelligent Universe: A New View of Creation and Evolution. 2nd Edn., Michael Joseph, London, ISBN: 9780718126131, Pages: 256.

Kintisch, E., 2009. Climate change: Deforestation moves to the fore in Copenhagen. Science, 326: 1465-1465.

Lineweaver, C.H., Y. Fenner and B.K. Gibson, 2004. The galactic habitable zone and the age distribution of complex life in the milky way. Science, 303: 59-61.

Margalef, R., 1996. Information and uncertainty in living systems: A view from ecology. Biosystems, 38: 141-146.

May, R.M., 1988. How many species are there on Earth. Science, 241: 1441-1449.

Ruse, M., 2003. Darwin and Design: Does Evolution Have a Purpose? Harvard University Press, Cambridge, MA., Pages: 384.

Sugimoto, T., 2002. Darwinian evolution does not rule out the gaia hypothesis. J. Theor. Biol., 218: 447-455.

Tudge, C., 2000. The Variety of Life. University Press, Oxford, Pages: 684.

West, G.B. and J.H. Brown, 2005. The origin of allometric scaling laws in biology from genomes to ecosystems: Towards a quantitative unifying theory of biological structure and organization. J. Exp. Biol., 208: 1575-1592.

Williams, G.C., 1966. Adaptation and Natural Selection. Princeton University Press, Princeton, New Jersey, USA.